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Sulphur Dioxide by Colorimetric Analysis

Practical 6 - Air-sampling data practical

Aim

To interpret a validated workplace-air sampling and analytical dataset for the specified gas.

Principle

An occupational-air result relates collected analyte mass to a defined sampled air volume. Collection medium, flow, breakthrough, recovery, analytical selectivity and reporting conditions are method specific. This exercise uses supplied or certified closed-system data and does not generate hazardous gas.

Materials and Requirements

- Selected current validated sampling method and safety assessment
- Supplied pump calibration, field blank and analytical records
- Gas-specific calibration and recovery data
- Approved method or teaching-data pack and a dated record sheet

Procedure

1. Define the preparation or dataset, study question and method version. Record identities, units and the criteria to be used before examining the outcome.
2. Identify the gas, applicable method, sampling medium, flow range, duration and required correction conventions.
3. Review pre- and post-sampling flow, field blanks, storage, holding time and breakthrough checks.
4. For the colour or instrument assay assess blank correction, calibration, interference and recovery evidence.
5. Calculate air concentration, document temperature/pressure conventions and compare only with the relevant current occupational limit and averaging period.
6. Retain the original observations and calculations. State deviations, missing information and the limits of the conclusion; do not replace measured values with expected results.

Observations and Record

Enter actual measurements or the supplied teaching data. Record the method, material identity, conditions and units.

Sampling / assay item	Raw value	Correction basis	Reported result
Flow / duration	Enter L/min and min	Volume convention	Calculate
Field blank / test	Enter micrograms	Blank correction	Calculate
Recovery / breakthrough	Record	Method rule	Evaluate

Calculations

- Sampled volume (m^3) = flow (L/min) x duration (min) / 1000
- Concentration (mg/m^3) = blank-corrected analyte mass (mg) / sampled volume (m^3)

Worked Example

Illustrative flow 0.20 L/min for 60 min gives 0.012 m^3. Net analyte mass 6.0 micrograms = 0.0060 mg; concentration = 0.50 mg/m^3.

Apply recovery and air-volume corrections only as prescribed; the example assigns no exposure limit.

Sulphur dioxide method record

• Use the selected gas-specific validated sampling and assay method. Record collection chemistry, analytical selectivity and interferences explicitly.
• For a colorimetric method retain wavelength, colour-development conditions and the calibration worksheet; do not substitute another gas method.

Result and Interpretation

• Report method, gas identity, blank, sampled volume, uncertainty and any invalidating sampling condition.

Precautions

• Do not generate or deliberately expose anyone to the gas.
• Use only supplied data or a professionally controlled certified system.
• Do not compare a short sample with a time-weighted limit without the proper averaging basis.

Viva Questions and Answers

Why analyse field blanks?

They reveal contamination introduced by media, handling and transport.

What is breakthrough?

Analyte passes beyond the collecting section, potentially biasing recovery.

Why specify averaging time?

Exposure limits refer to defined time bases.

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